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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,945	09/10/2003	Seok-Joo Doh	5649.1123IP	5066

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EXAMINER	
SCHILLINGER, LAURA M	

ART UNIT	PAPER NUMBER
2813	

DATE MAILED: 05/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/659,945	DOH ET AL.	
	Examiner	Art Unit	
	Laura M. Schillinger	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) *14-45* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/19/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of claims 1-13 in the reply filed on 3/14/05 is acknowledged. The traversal is on the ground(s) that claims 1-13 are generic. However, this is not persuasive because claim 1 is not generic to claims 20 and 32.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Ballantine et al ('592).

Ballantine teaches the following claimed limitations as cited below:

1. A method for treating a high dielectric layer of a semiconductor device comprising:

nitriding a high dielectric layer(Col.5, lines: 10-65 and Fig.2 (16) on a silicon substrate (Fig.2 (10)), wherein said high dielectric layer comprises a nano laminate comprising a Group 3 metal oxide layer a layer selected from the group consisting of a hafnium oxide layer and a

zirconium oxide layer (Col.4, lines: 15-25) and wherein an ozone oxide layer is positioned between said high dielectric layer and said silicon substrate (Fig.1 (14) and Col.3, lines: 58-65) see also Col.8, lines: 45-50); and

post treating the high dielectric layer, ozone oxide layer, and silicon substrate (Col.7, lines: 40-45).

2. The method of claim 1, wherein nitriding a high dielectric layer comprises nitriding said high dielectric layer using a nitriding process selected from the group consisting of a nitrogen plasma treatment process, a thermal treatment process in a nitrogen atmosphere, and a thermal treatment process comprising thermally treating the high dielectric layer after forming a nitrogen layer on the high dielectric layer (Col.5, lines: 10-65).

3. The method of claim 1, wherein post treating the high dielectric layer, ozone oxide layer, and silicon substrate comprises post treating using a process selected from the group consisting of an oxidation process and an annealing process (Col.7, lines: 40-45).

4. The method of claim 1, further comprising forming said high dielectric layer (16) on an ozone oxide layer (14) over a silicon substrate (10) (Fig.2).

5. The method of claim 4, wherein forming said high dielectric layer on an ozone oxide layer over a silicon substrate comprises:

depositing a first layer selected from the group consisting of a hafnium oxide layer and a zirconium oxide layer(16) on the ozone oxide layer (14); and

depositing a Group 3 metal oxide layer over the first layer (16- Col.4 ,lines: 15-25).

6. The method of claim 5, wherein the Group 3 metal oxide layer is selected from the group consisting of aluminum oxide and yttrium oxide (Col.4, lines: 15-25).

7. The method of claim 5, further comprising depositing an additional layer over the ozone oxide layer, the additional layer selected from the group consisting of a hafnium silicate layer, a zirconium silicate layer, and an aluminum silicate layer (Col.4, lines: 15-25).

8. The method of claim 4, further comprising forming an ozone oxide layer (14) on a silicon substrate (10) (Fig.1).

9. The method of claim 8, wherein forming said ozone oxide layer on a silicon substrate comprises flushing said silicon substrate with ozone in situ (Col.7, lines: 1-5).

10. (Original) The method of claim 8, wherein forming said ozone oxide layer on a silicon substrate comprises forming said ozone oxide layer using atom layer deposition (Col.4, lines: 40-50).

11. The method of claim 8, wherein forming said ozone oxide layer on a silicon substrate comprises forming said ozone oxide layer using chemical vapor deposition (Col.4, lines: 40-50).

12. The method of claim 8, wherein forming said ozone oxide layer on a silicon substrate comprises forming said ozone oxide layer at a temperature between about 320 degrees C and about 450 degrees C (Col.6, lines: 15-20)

13. The method of claim 1, wherein said ozone oxide layer comprises an ozone oxide layer having a thickness of about 8 A or less (Abs., lines: 1-10).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura M. Schillinger whose telephone number is (571) 272-1697. The examiner can normally be reached on M-T, R-F 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Laura M Schillinger
Primary Examiner
Art Unit 2813

4/30/05